

# Experiences with the Library Creation module

Michaela Srncik

EC Joint Research Centre (JRC)  
ITU - Institute for Transuranium Elements  
Karlsruhe, Germany

2<sup>nd</sup> Advanced Training Course on Illicit Trafficking and Radiological Consequences with NUCLEONICA,  
Institute of Transuranium Elements, Karlsruhe, 4-6<sup>th</sup> November 2009

<http://itu.jrc.ec.europa.eu/>  
<http://www.jrc.ec.europa.eu/>



- **Irish Sea sediment samples →  $\gamma$ -spectrometry**
- **GammaVision<sup>®</sup>-32 V6**
- **Create an own nuclide library**
  - One has to enter every detail (nuclide, energy, emission probability,  $T_{1/2}$ , etc)
  - GammaVision<sup>®</sup>-32 V6 database not up to date
- **→ library creation module by Nucleonica**

The screenshot displays the nucleonica web application interface. The top navigation bar includes "Applications", "My Preferences", "Print", and "Help". The left sidebar menu lists various applications, with "Library Creation" highlighted. A red arrow points from the "Library Creation" menu item to the main content area. The main content area features a header with the nucleonica logo and the text "... web driven nuclear science". Below this is a section titled "Library creation for 3rd party software" with an atomic symbol icon. The "Application" tab is active, showing a form with "Element" (Ac) and "Isotope" (206) dropdown menus, and buttons for "Add", "Remove", and "Remove All". Below the form is a table with columns "Nuclide", "Halflife Unit ΔT%", and "Halflife (s)", containing multiple rows labeled "Edit".



## Library creation for 3rd party software

Application

Element

Isotope

Ac

206

Add

Remove

Remove All

	Nuclide	Halflife Unit $\Delta T\%$	Halflife (s)
Edit			
Edit			
Edit			
Edit			
Edit			
Edit			
Edit			
Edit			

Database

Nucleonica

Nucleonica

8th Table of isotopes

JEFF-3.1

Create Library

Application

Element

Isotope

Ac

206

Ac

Ag

Al

Am

Ar

As

At

Au

B

Ba

Be

Bh

Bi

Bk

Br

C

Ca

Cd

Ce

Cf

Cl

Cm

Co

Cr

Cs

Cu

Db

Ds

Dy

Er

Remove

Remove All

Halflife Unit  $\Delta T\%$

Halflife (s)

Create Library

X-rays

Application

Element Isotope

Am 241

**Add** Remove Remove All

	Nuclide	Halflife Unit $\Delta T\%$	Halflife (s)
Edit			
Edit			
Edit			
Edit			
Edit			
Edit			
Edit			

Database

8th Table of isotop Create Library

☒ Gamma rays ☐ X-rays

	1	2	3
	Nuclide	Halflife Unit $\Delta T\%$	Halflife (s)
Edit	95 Am241	432.2 y 0.7	13658100000
Edit			
Edit			
Edit			
Edit			
Edit			
Edit			
Edit			

1: Nuclide

2: Halflife Unit  $\Delta T_{1/2}$

3: Halflife (s)

4: Energy (keV)

5:  $\Delta E$  (keV)

6: Emission probability

7: Type

	1	4	5	6	7
	Nuclide	Energy (keV)	$\Delta E$ (keV)	Emission probability	Type
95 Am241	13.81	0	0		Gamma
95 Am241	26.345	0	0.024		Gamma
95 Am241	27.03	0	0		Gamma
95 Am241	31.4	0	0		Gamma
95 Am241	32.183	0	0.000174		Gamma
95 Am241	33.196	0	0.00126		Gamma
95 Am241	38.54	0	0		Gamma
95 Am241	42.73	0	5.5E-05		Gamma
95 Am241	43.423	0	0.00073		Gamma
95 Am241	51.01	0	2.6E-07		Gamma
95 Am241	54	0	0		Gamma
95 Am241	55.56	0	0.000181		Gamma
95 Am241	56.8	0	0		Gamma
95 Am241	57.85	0	5.2E-05		Gamma
95 Am241	59.541	0	0.359		Gamma
95 Am241	61.46	0	0		Gamma
95 Am241	64.83	0	1.45E-06		Gamma
95 Am241	67.45	0	4.2E-06		Gamma
95 Am241	69.76	0	2.9E-05		Gamma
95 Am241	75.8	0	5.9E-06		Gamma
95 Am241	78.1	0	0		Gamma
95 Am241	79.1	0	0		Gamma
95 Am241	92.1	0	0		Gamma
95 Am241	96.7	0	0		Gamma
95 Am241	98.97	0	0.000203		Gamma

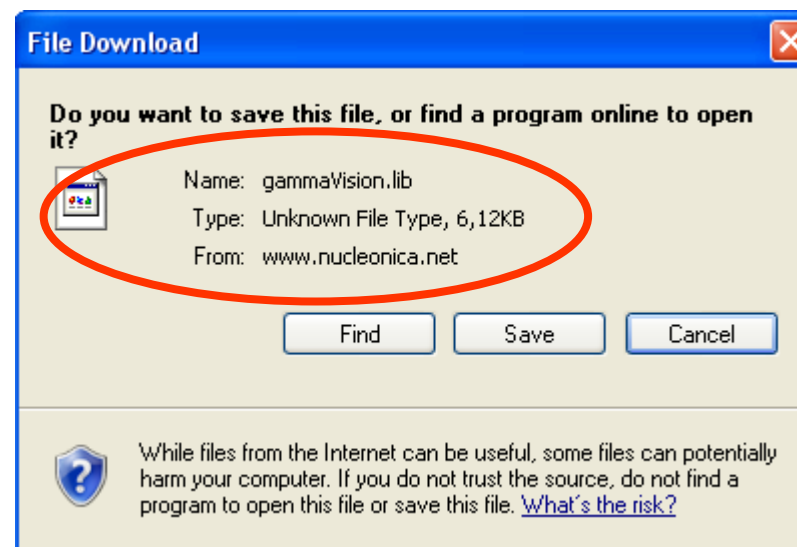
1 2 3 4 5 6 7

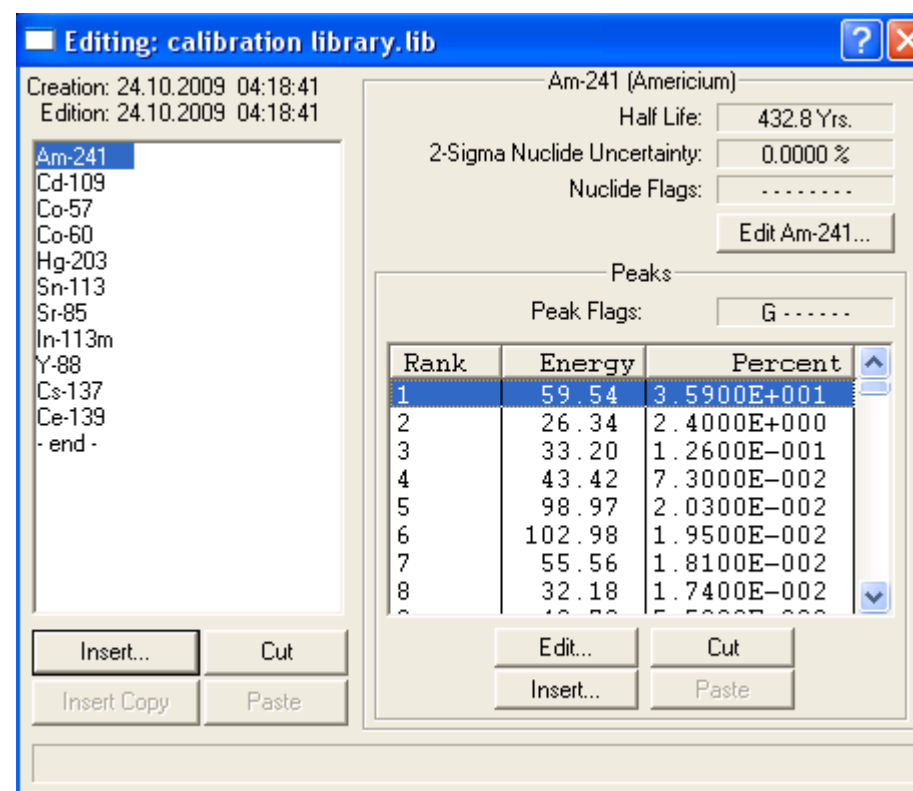
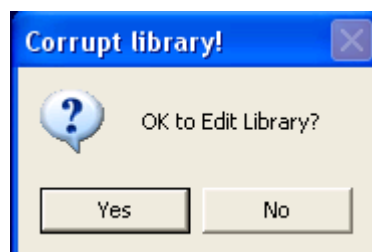
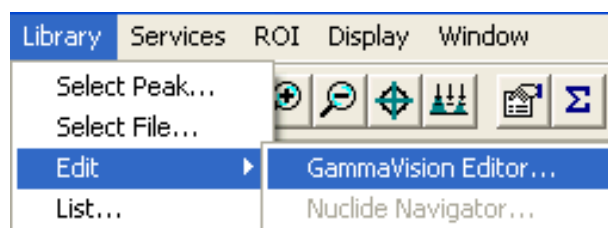
	Nuclide	Halflife Unit $\Delta T\%$	Halflife (s)
Edit	95 Am241	432.2 y 0.7	13658100000
Edit	48 Cd109	461.4 d 1.2	39968600
Edit	27 Co57	271.74 d 0.06	23483500
Edit	27 Co60	5.2713 y 0.0008	166337000
Edit	80 Hg203	46.612 d 0.018	4026500
Edit	50 Sn113	115.09 d 0.03	9943780
Edit	38 Sr85	64.853 d 0.008	5602950
Edit	49 In113 m	1.66 h	5968.44
Edit	39 Y88	106.65 d 0.04	9212750
Edit	55 Cs137	30.1671 y 0.0013	947990000
Edit	58 Ce139	137.641 d 0.020	11892200

Final nuclide library

Database  
8th Table of isotop ▼ **Create Library**

☒ Gamma rays ☐ X-rays





- **Only selection of isotopes (i.e. no energy,  $T_{1/2}$ , etc. is necessary to add)**
- **Choice of data base:  
Nucleonica, 8<sup>th</sup> Tables of Isotopes and JEFF-3.1**
- **Up to date nuclear data**



- **Not possible to upload library file**
- **Cannot delete energies**
  - E.g.  $^{241}\text{Am}$ : in total 196 entries, only 2 are necessary
- **Some emission probabilities are zero**

- **Upload library file for update**
- **Select only desired energies**
- **Box where you can see/enter the page**
- **Save library files on Nucleonica**

**THANK YOU FOR YOUR ATTENTION !**